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USWEST

Glenn Brown
Executive Director-
Public Policy

October 9, 1997

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OCT - 9 1997
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Mr. William F. Caton, Acting Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, DC 20554

RE: CC Docket Nos. 96-45 and 97-160

Dear Mr. Caton:

On October 8, 1997 the sponsors of the BCPM and Hatfield models met with members of the Universal Service Joint Board Staff to continue our ongoing discussion of the proxy models. The attendees at this meeting/conference call are indicated on the attached list.

On behalf of the BCPM sponsors I made a presentation on transmission and loop design issues. A copy of the charts used in the presentation are attached. In addition to the material provided on the charts, we provided the following list prices for the DSC line cards: RPOTS $570, REUVG $1,110. In addition, we agreed to file copies of the following documents on the record: The Bellcore study which supports the modem speed matrix, Documentation supporting our recommendation that the bandwidth specification for voice grade service be modified to 300 Hz to 3200 Hz, and Documentation for other DSC line cards which enable the system to provide advanced telecommunications services. These documents will be provided in several days, under separate cover.

Anthony Bush raised a question regarding several of the formulas contained in the BCPM documentation which had been previously provided on the record in this proceeding. It was agreed that a conference call would be held the following day to answer his questions. That conference call occurred on October 9, 1997 and included: Glenn Brown U S WEST, Jim Stegeman INDETEC, Anthony Bush and Bill Sharkey of the FCC, and Vaikunth Gupta of Panum Telecom, LLC.

Since this meeting occurred late in the day, this letter is being filed the following business day. In accordance with Commission Rule 1.1206(a)(2), the original and one copy of this summary of the presentation is being filed with your office. Acknowledgement and date of receipt are requested. A copy of this submission is provided for this purpose. Please contact me if you have questions.

Sincerely,

Glenn H Brown

10/8/97 Meeting Attendees

FCC and JOINT BOARD:
Natalie Wales, FCC
Wade Harriman, FCC
Abdel Eqab, FCC
Stagg Newman, FCC
Bill Sharkey, FCC
Bryan Clopton, FCC
Brad Wimmer, FCC
Jeff Prisbuy, FCC
Chuck Keller, FCC
Charlie Bolle, SD PUC
Ann Dean, MD PSC
Brian Roberts, CA PUC
Kevin Schwenzfier, NY DPS
Tiane Sommer, GA PSC
Barry Payne, IN Office of Consumer Counsel
OTHER STATE REGULATORS:
David Dowds, FL PSC
Anthony Myers, MD PSC
OTHER ATTENDEES:
Rich Clarke, ATT
John Donovan, Telecom Visions (Hatfield team)
Ernie Carter, ATT/MCI
Tom Madden, ATT
Whit Jordan, Bell South
Ed Cameron, RUS
John Huslig, RUS
Gary B. Allan, RUS
Chris Frentrup, MCI
J. McGirr-Conti, Bell Atlantic
P. Lonagan, Bell Atlantic
Scott Randolph, GTE
Rick Cimerman, NCTA
Glenn Brown, U S West
Hal Baumhardt, Sprint
Kathleen Abernathy, Airtouch
Michael Katz, for Airtouch
David Porter, World Com
Pam Fusting, NTCA
John Ulanskas U S WEST
Peter Copeland, U S WEST
Jim Stegeman, INDETEC

BCPM
Benchmark Cost Proxy Model

LOOP DESIGN ISSUES

OCTOBER 8, 1997

sponsored by Sprint. US WEST BELLSOUTH

BCPM

MAJOR ISSUES

- LEGISLATIVE MANDATES FOR NETWORKS
- BASICS OF TELEPHONE TRANSMISSION DESIGN
- DESIGN ASPECTS OF HATFIELD AND BCPM
- STRUCTURE SHARING ISSUES
- PUTTING IT ALL IN PERSPECTIVE
- PUBLIC POLICY DIFFERENCES BETWEEN UNE PRICING AND UNIVERSAL SERVICE SUPPORT

GUIDANCE ON NETWORK DESIGN FROM THE 1996 ACT

Section 254(b) Universal Service Principles - The Joint Board and the Commission shall base policies for the preservation and advancement of universal service on the following principles:

(2) **Access to Advanced Services** - Access to advanced telecommunications and information services should be provided in all regions of the Nation.

(3) **Access in Rural and High Cost Areas** - Consumers in all regions of the Nation, including low-income consumers and those in rural, insular and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas...

(5) **Specific and Predictable Support Mechanisms** - There should be specific, predictable and sufficient Federal and State mechanisms to preserve and advance universal service.

NETWORK DESIGN PRINCIPLES

FACTORS IN LOOP PLANT DESIGN:

1. No loop exceeds the office signaling range
2. Sufficient current to power station set
3. Transmission loss satisfactory on both ends

LOOP DESIGN STANDARDS HAVE BEEN DEVELOPED TO ASSURE SEAMLESS WORLDWIDE CONNECTIVITY:

- Overall circuit performance is the sum of the loops on both ends, the central offices on both ends, and the interoffice transmission
- Equipment manufacturers build equipment to function within these design standards
- Without standards, interconnectivity would be difficult

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LOOP DESIGN STANDARDS

1. REVISED RESISTANCE DESIGN (RRD)
   - Maximum loop resistance 1500 ohms
   - Load all loops over 18Kft
   - Applied to loops which originate at C.O.
2. CARRIER SERVING AREA (CSA)
   - Wire Center sectionalized into CSAs beginning 12 Kft from the C.O.
   - Each CSA is served by a remote DLC terminal (RT)
   - Maximum loop resistance of 900 ohms from the RT
     - 9 kft of 26 gauge cable
     - 12 kft of 19, 22, or 24 gauge cable, including bridged tap
   - Capable of access to advanced services

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TRANSMISSION FUNDAMENTALS

RESISTANCE IS INFLUENCED BY CABLE GAUGE DISTANCE AND TEMPERATURE

LENGTH	AT 68°F	AT 100° F	AT 120° F
26 GAUGE			
9 Kft	750 Ω	800 Ω	833 Ω
12 Kft	1000 Ω	1067 Ω	1111 Ω
18 Kft	1500 Ω	1601 Ω	1666 Ω
24 GAUGE			
9 Kft	467 Ω	503 Ω	524 Ω
12 Kft	623 Ω	671 Ω	699 Ω
18 Kft	934 Ω	1007 Ω	1048 Ω

MAXIMUM DESIGNED TO CIRCUIT LOSS

POTS	-8.0 dB @ 1 Khz	1300 Ω
PBX/CENTREX	-4.5 dB @ 1 Khz	750 Ω
ISDN	-42 dB @ 40 Khz	1300 Ω

BCPM

BCPM vs. HATFIELD

DLC DESIGN STANDARDS

- BCPM = 900 ohms
  - per CSA Guidelines
- HATFIELD =1500 ohms
  - per non-standard "Performance Standard"

HOW DOES HATFIELD GET THEIR "PERFORMANCE STANDARD"?

- Maximum 1930 ohm range for DSC RPOTS line card
- Less 430 ohms for telephone set
- Yields 1500 ohm "Performance Standard"

DSC "RPOTS" CARD

PER DSC PRACTICE 0SP 363-005-802:

"The Remote Terminal "Plain Old Telephone Service" (RPOTS) is the remote terminal subscriber interface to Litespan, ... Excluding the telephone set, a nominal 2 dB of loss is provided per line in each direction, supporting a ***practical*** *loop length ranging from 0 to 1000 ohms. Including the telephone set, the maximum loop length is 1930 ohms."* (emphasis added)

WHY IS 1500 OHMS NOT THE CORRECT STANDARD?

- DSC's advice on the practical loop length reflects sound principles:
  - The RPOTS card introduces 2 dB of loss (75% of 8dB standard) into the loop.
  - 1300 ohms x 0.75 = 975 ohms (rounds to 1000 ohms).
  - The Hatfield standard exceeds the manufacturer's recommended standard by 50%.
- DSC does make an extended range card "REUVG"

DSC "REUVG" CARD

PER DSC PRACTICE OSP 363-005-809:

"The REUVG is typically used for special service applications and extended range loop lengths. Each REUVG provides provisioned transmission gain an d equalization with adjustable hybrid balance for loop lengths up to and beyond the customer serving area (CSA) limits."

HATFIELD DOES NOT ADEQUATELY CONDITION FO THE EXTRA LOOP LENGTH IN THEIR NETWORK

- The REUVG is priced roughly twice the RPOTS.
- To our knowledge, Hatfield does not include the extra cost of the REUVG card.
- At an 18Kft 26 gauge loop, Hatfield will be pushing the signaling limits of the RPOTS card
- An 18,000 foot Grid will have many loops in excess of 18 Kft

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MAXIMUM MODEM SPEEDS

BELLCORE has conducted research to determine the factors which influence the maximum modem speed which a given loop can handle. Based on their findings, the following matrix predicts maximum V.34 modem speed. Points are awarded for each of seven variables:

			POINTS
1. CUSTOMER LOOP (each end)			
0 - 9 Kft NL = 0	9 - 12 Kft NL = 1	12 - 18 Kft NL = 3	______
18- 24 Kft L = 7	24 - 30 Kft L = 10	> 30 Kft L = 12	______
2. LOOP CARRIER (each end)			______
No DLC = 0	IDLC = 2	UDLC = 6	______
3. SWITCH TYPE (each end)			______
Analog = 0	Digital = 1		______
4. INTEROFFICE FACILITY			
Digital Route = 2	Analog Tandem = 4	B/B - Cxr = 6	______
		TOTAL	

SCORING:

0 - 6 = 28.8 Kbps	7 - 9 = 26.4 Kbps	10 - 13 = 24.0 Kbps	14 - 16 = 21.6 Kbps
17 - 20 = 19.2 Kbps	21 - 25 = 14.4 Kbps	26 - 30 = 9.6 Kbps	

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STRUCTURE SHARING

- LECs DO HAVE SOME OPPORTUNITY TO SHARE STRUCTURES
  - Primarily for distribution facilities in new residential subdivisions
  - Rarely for feeder plant
  - BCPM includes reasonable estimates for sharing (e.g., 50% for poles)
- HATFIELD EMPLOYS UNREASONABLE SHARING ASSUMPTIONS
  - The best case is assumed in every case, distribution and feeder, aerial and burried
  - For each new customer, one to three other utilities appear instantaneously
  - These other utilities require no high-cost assistance, even in the most costly areas
- THIS APPROACH SPELLS TROUBLE FOR UNIVERSAL SERVICE
  - Network providers will only be compensated for 1/4 to 1/2 of the cost of serving high-cost areas
  - Network providers will be unwilling to build to high-cost customers
  - Rural rates will be forced to rise

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PUTTING IT IN PERSPECTIVE

1. "FORWARD-LOOKING" INVOLVES CERTAIN CONCESSIONS TO REALITY:
   - Networks aren't built with one "efficient" build-out
   - Planners do not have perfect knowledge
   - Today's "forward-looking" is tomorrow's "embedded"
2. THE HATFIELD MODEL ASSUMES THE MOST OPTIMISTIC CASE IN EVERY CASE:
   - Perfect structure sharing
   - Eclectic mix of state-of-the-art and antiquated technologies, running flat-out
   - The Hatfield network exists in the mind of the economist, not the world of the engineer

BCPM

WHAT IS THE IMPACT?

- By assuming each component is perfect, you create a theoretical aggregate outcome that will never happen.
- An Example:
  - IF HATFIELD WERE A GOLF GAME ...
    - ASSUME AN "EFFICIENT" GOLFER
      - All drives in the fairway
      - All greens hit in regulation
      - All approach shots roll close
      - All puts go in
    - SCORE = 54

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PUBLIC POLICY PERSPECTIVES

UNE PRICING

MAJOR OBJECTIVES

- Encourage local market entry
- Price at cost (TELRIC)
- Keep the costs low

IF COSTS ARE UNDERESTIMATED

- More competitors enter market
- Adverse financial impact to the incumbent

IF COSTS ARE OVERESTIMATED

- Local entry discouraged

UNIVERSAL SERVICE

MAJOR OBJECTIVES

- "Specific, Predictable and Sufficient" explicit support
- Affordable rural service
- Access to advanced services

IF COSTS ARE UNDERESTIMATED

- Providers will not serve high-cost rural areas
- Rural rates will rise
- Rural customers will not have access to advanced services

IF COSTS ARE OVERESTIMATED

- ILECs and others will overpay to fund
- "Gaming" of the system

UNE pricing may involveincentives to err on the low side. However underestimation of costs for universal service support can have severe public policy consequences. The Hatfield model was developed primarily for UNE pricing, and tends to understate costs. The BCPM attempts to neither understate nor overstate forward-looking costs.

BCPM

CONCLUSIONS

- THE NETWORK STANDARD IN THE 5/8/97 DECISION SHOULD BE REVISED
  - 500 Hz to 4000 Hz is not supported by current network standards and equipment
  - BCPM sponsors suggest modification to 300 Hz to 3200 Hz
- THE MODEL SHOULD ADOPT A 12,000 Ft GRID ARCHETECTURE
  - An 18,000 ft grid archetecture will result in many loops significantly longer than 18 Kft
  - This could exceed signaling ranges, transmission parameters and require costly loop electronics
  - A 12,000 ft grid allows for adoption of the economical CSA standards, and provides ready access to advanced telecommunications services
- THE MODEL SHOULD REFLECT THE COST OF PROVIDING SUPPORTED SERVICES IN HIGH-COST AREAS
  - Unrealistic structure sharing assumptions will produce unintended adverse public policy consequences

RESISTANCE DESIGN

AT&T 901-350-202, 902-115-100, -101

Resistance design is predicated upon controlling transmission losses by limiting the maximum conductor loop resistance. This design is used with the traditional twisted-pair copper cable. The demand for high-speed transmission rates has changed the guidelines for designing outside plant. To meet these demands, the outside plant network is being conditioned by the use of digital subscriber carrier systems. These systems are being served via either a T1 or E1 carrier with repeaters or fiber optic cable.

Because of these factors and for planning purposes, it is recommended that the point where resistance design should stop and subscriber carrier or long-route design should begin is at 12,000 feet (3658 m) from the central office. Under this premise, resistance design rules are as follows:

1. Maximum conductor loop resistance of 1500 ohms without loop electronics (central office range permitting).
2. Load all loops over 18,000 feet (5486 m), which includes bridged tap.
3. Limit bridged tap on nonloaded loops to 6,000 feet (1829 m) or less.
4. Limit end section plus bridged tap on loaded loops to 12,000 feet (3658 m) or less. Business loop end sections are limited to 9,000 feet (2743 m) with no bridged tap.
5. Design load spacing deviations normally within ±120 feet (37 m).
6. No bridged tap between load points.
7. No loaded bridged taps.
8. No stations (Customer Services) are allowed between load points.

These rules are illustrated on the next page.

Section 13

DIGITAL LOOP CARRIER SYSTEMS

GENERAL

The increasing demand for an assortment of special services has made it necessary to condition the local loop network to support these services. It must be able to accommodate a wide range of transmission applications including voice, data, video, sensor control, and many others. Some of these services require high rates of transmission. Existing copper facilities can support some of the services. However, in many cases, expensive reconditioning of the cable plant will be necessary before service can be provided. The goal is to have the entire local loop network ultimately capable of supporting a transmission rate of 64 kb/sec. Nonloaded 26-gauge cable is capable of providing this bit rate within 12,000 feet (3657.6 m) of the serving central office. Digital subscriber carrier (pair gain) is necessary to meet that bit rate beyond 12,000 feet (3657.6 m).

Carrier Serving Area (CSA) Philosophy

The Carrier Serving Area (CSA) concept is to sectionalize the wire center area into discrete geographical areas beyond 12,000 feet (3657.6 m) of the central office. This sectionalization is done during the long-range outside plant planning (LROPP) process described in Section 2 of this handbook. Each CSA will ultimately be served via a remote terminal (RT) which houses the digital carrier equipment and divides the feeder from the distribution network. The boundaries of the CSA are based on resistance limits of 900 ohms for the distribution plant beyond the RT. These limits basically equate to 9,000 feet (2743.2 m) of 26-gauge cable and 12,000 feet (3657.6 m) of 19-, 22-, or 24-gauge cable including bridged tap. After the CSAs are established, when relief is required in a route and it is economical to deploy digital carrier, the RT sites can be activated. Digital carrier is also applicable to individual customer buildings or groups of buildings such as a campus environment, industrial areas, shopping centers, and condominium and apartment complexes.

REMOTE TERMINAL POTS (RPOTS)

P/N: 300-1121-900

CONTENTS

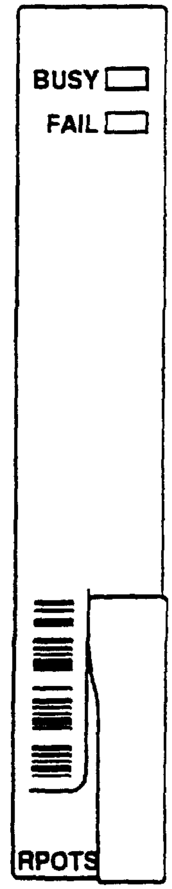

Figure 2-1
RPOTS

1 GENERAL

1.01 The Remote Terminal "Plain Old Telephone Service" (RPOTS) is the remote terminal subscriber interface to Litespan, counterpart to the central office terminal CPOTS channel unit. The RPOTS channel unit is also used in the central office terminal for applications such as PBX off-premises line. RPOTS units are loop-start-only with a fixed compromise hybrid balance for operation on either loaded or unloaded loops in both the 600-ohm and 900-ohm environment. The RPOTS channel unit provides forward disconnect and optional on-hook transmission for custom local area signaling services (CLASS). Excluding the telephone set, a nominal 2 dB of loss is provided per line in each direction, supporting a practical loop length ranging from 0 to 1000 ohms. Including the telephone set, the maximum loop length is 1930 ohms.

1.02 This is the third issue of this document. The loop current specifications have been changed, as has the definition of practical loop length (see above). The list of provisionable options with their limits and defaults has been replaced by a reference to the Channel Unit Provisioning Summary, OSP 363-005-300. This document describes the channel unit's functions which may be controlled through software.

1.03 Litespan channel units have no physical switches. All optioning information or provisioning is entirely controlled through software. Provisioning is accomplished from a co-located or remote computer terminal using TL1 or OMAPS.

1.04 The RPOTS provides foreign exchange station (FXS) functionality. In limited applications, the unit can also be used for locally switched, loop-start services, such as PBX trunks, WATS trunks and lines, or nonlocally switched, loop-start services. Each module supports four independent circuits. Refer to Narrowband Services Application Guide, OSP 363-205-110, for information on compatible hybrid circuits.

1.05 Litespan channel units provide metallic test access at the tip and ring for monitoring and maintenance or as an interface for such test systems as Pair Gain Test Controller (PGTC) or Extended Test Controller (XTC). Access is provided via the Metallic Test Access Unit (MTAU) that provides both monitor and split capabilities. Operation is software-controlled through TL1 or OMAPS.

2 PHYSICAL DESCRIPTION

2.01 The RPOTS is a printed circuit board plug-in module. Its physical dimensions are 4.42 inches high by 10.2 inches deep by 0.84 inches wide at the faceplate. The unit has a board extractor lever to ensure that the connector seats properly and to aid in the unit's removal.

REMOTE TERMINAL EXTENDED-RANGE UNIVERSAL VOICE GRADE (REUVG)

P/N: 300-1131-900

CONTENTS

1 GENERAL

1.01 The Remote Terminal Extended-Range Universal Voice Grade (REUVG) channel unit is the subscriber interface for the Litespan, counterpart to the central office terminal CEUVG channel unit. The REUVG is typically used for special service applications and extended-range loop lengths. Each REUVG provides provisioned transmission gain and equalization with adjustable hybrid balance for loop lengths up to and beyond customer service area (CSA) limits. Line circuits may be provisioned to operate with loaded cable. In universal Litespan applications, the CEUVG and REUVG cards operate together to provide a 2-wire analog interface to the CO switch. The REUVG card supports ground-start/loop-start and reverse-battery signaling. Reverse-battery signaling supports direct inward dialing (DID) for use with PBX systems.

1.02 This is the third issue of this document. The list of provisionable options with their limits and defaults has been replaced by a reference to the Channel Unit Provisioning Summary, OSP 363-005-300. This document describes the channel unit's functions which may be controlled through software.

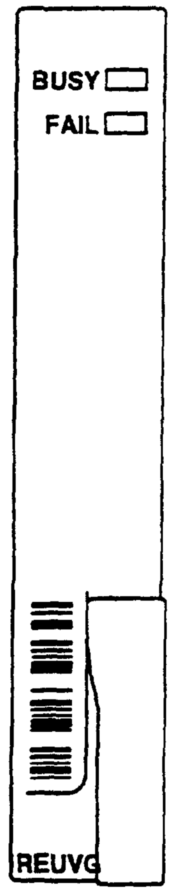

Figure 2-1
REUVG

1.03 Litespan channel units have no physical switches. All optioning information or provisioning is entirely controlled through software. Provisioning is accomplished from a co-located or remote computer terminal using TL1 or OMAPS.

1.04 The REUVG is a multifunctional module that supports foreign exchange station (FXS), dial pulse originating (DPO), private line automatic ringdown (PLAR), and extended transmission only with gain transfer and sealing current (ETO/GT/SC) functionalities. Each module supports four independent circuits. Refer to Narrowband Services Application Guide, OSP 363-205-110, for information on compatible hybrid circuits.

1.05 Litespan channel units provide metallic test access at the tip and ring for monitoring and maintenance or as an interface for such test systems as Pair Gain Test Controller (PGTC) or Extended Test Controller (XTC). Access is provided via the Metallic Test Access Unit (MTAU), which provides both monitor and split capabilities. Operation is software-controlled through TL1 or OMAPS.